Claims

What is claimed is:

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1. An engine control system, comprising:

an engine cylinder;

an engine piston reciprocatingly disposed in the engine cylinder;

a valve operatively associated with the engine cylinder;

a mechanically driven actuator assembly adapted to open the valve;

a fluidically driven actuator adapted to open the valve;

at least one sensor associated with the engine and adapted to generate an operation signal representative of an engine operation; and

a controller adapted to receive the operation signal and transmit a control signal to the fluidically driven actuator and opening the valve based on the operation signal.

2. The engine control system of claim 1, wherein the fluidically driven actuator is in constant communication with one of a source of high pressure fluid and a source of low pressure fluid.

3. The engine control system of claim 1, wherein the controller generates the control signal during a compression stroke of the engine.

4. The engine control system of claim 1, wherein the controller generates the control signal during an intake stroke of the engine.

5. The engine control system of claim 1, wherein the valve is an intake valve.

6. The engine control system of claim 1, wherein the valve is an exhaust valve.

7. The engine control system of claim 1, wherein the control signal actuates the fluidically driven actuator a predetermined length of time.

8. The engine control system of claim 1, wherein the sensor monitors engine crank angle and wherein the control signal is generated in response to the engine crank angle being at a predetermined crank angle.

9. The engine control system of claim 8, wherein the predetermined crank angle is approximately 528° of engine crank angle.

10. The engine control system of claim 8, wherein the predetermined crank angle is approximately 498° to 558° of engine crank angle.

11. The engine control system of claim 1, wherein the sensor monitors engine speed.

12. The engine control system of claim 1, wherein the sensor monitors temperature.

13. An engine valve actuator, comprising:

an actuator cylinder having a fluid passage;

an actuator piston reciprocatingly disposed in the actuator cylinder; and

a control valve operatively associated with the actuator cylinder, said control valve having a housing, said housing having a low pressure fluid inlet, a high pressure fluid inlet, and a fluid outlet, a plunger having first and second ends reciprocatingly disposed in the housing, the plunger being movable between a first position at which the low pressure fluid inlet is in communication with the fluid outlet, and a second position at which the high pressure fluid inlet is in communication with the fluid outlet, the fluid outlet being in fluid communication with the actuator cylinder fluid passage.

14. The engine valve actuator of claim 13, further including an electromagnetic device proximate the plunger first end, and a spring proximate the plunger second end, said plunger being movable to the first position upon deactuation of the electromagnet device, said plunger being movable to the second position upon actuation of the electromagnetic device.

15. The engine valve actuator of claim 13, further including an actuator plunger operatively associated with the actuator piston and adapted to extend through an aperture disposed in the actuator cylinder when the control valve plunger is in the second position.

16. The engine valve actuator of claim 15, wherein the actuator plunger is unitary with the actuator piston.

17. An engine, comprising:

an engine cylinder;

an engine piston reciprocatingly disposed in the engine cylinder;

a valve reciprocatingly disposed in a port extending from the engine cylinder;

a first source of pressurized fluid;

a second source of pressurized fluid, the second source being pressurized to a higher level than the first source; and

a valve actuator adapted to be in fluid communication with the first and second source of pressurized fluid, the first source taking up any lash associated with the engine, the second source causing the valve actuator to open the valve.

18. The engine of claim 17, wherein the valve actuator includes an actuator cylinder having an actuator piston reciprocatingly disposed in the actuator cylinder, and a control valve adapted to direct pressurized fluid from one of the first and second sources of pressurized fluid to the actuator cylinder.

19. The engine of claim 18, wherein the control valve comprises:

a housing having a low pressure fluid inlet, a high pressure fluid inlet, and a fluid outlet;

a spool reciprocatingly disposed in the housing, the spool having first and second ends, the spool adapted to move from a first position connecting the low pressure fluid inlet to the fluid outlet to a second position connecting the high pressure fluid outlet to the fluid outlet;

an electromagnetic device operatively associated with the spool first end, the spool being movable to the second position upon actuation of the electromagnetic device; and

a spring operatively associated with the spool second end, the spool being movable to the first position by the spring upon deactuation of the electromagnetic device.

20. The engine of claim 17, wherein the first source of pressurized fluid is a lubrication oil system of the engine.

21. The engine of claim 17, wherein the second source of pressurized fluid is a high pressure rail of the engine.

22. The engine of claim 17, wherein the valve is an exhaust valve.

23. The engine of claim 17, wherein the valve is an intake valve.

24. The engine of claim 17, wherein the valve actuator is fluidically driven, and wherein the engine further includes a mechanically driven actuator.

25. A method of controlling an engine, comprising:

providing an engine having an engine cylinder, an engine piston reciprocatingly disposed in the engine cylinder, a valve port in fluid communication with the engine cylinder, a valve reciprocatingly disposed in the valve port, a fluidically driven valve actuator operatively associated with the valve, a mechanically driven valve actuator operatively associated with the valve, a source of low pressure fluid, and a source of high pressure fluid, the engine having intake, compression, power and exhaust strokes;

supplying one of the low and high pressure fluid sources to the fluidically driven actuator;

opening the valve during one of the intake and exhaust strokes using the mechanically driven actuator; and

opening the valve during the compression stroke using the fluidically driven actuator.

26. The method of claim 25, wherein the opening steps are performed using an intake valve.

27. The method of claim 25, wherein the opening steps are performed using an exhaust valve.

28. The method of claim 25, wherein the opening step using the fluidically driven actuator is performed by connecting the source of high pressure fluid to the fluidically driven actuator.

29. A method of claim 25, wherein the source of low pressure fluid is a lubrication oil system of the engine.

30. The method of claim 25, wherein the source of high pressure fluid is a high pressure rail of the engine.

31. The method of claim 25, wherein the source of low pressure fluid is used to take up any lash in the system.

32. The method of claim 25, wherein the engine further includes a control valve adapted to connect one of the low pressure source and high pressure source to the fluidically driven actuator.

33. The method of claim 32, wherein the engine further includes a processor and a sensor, the sensor being adapted to transmit a signal representative of engine operation to the processor, the processor adapted to transmit a signal to the control valve based on the signal from the sensor.

34. The method of claim 33, wherein the sensor is adapted to monitor one of the group of parameters consisting of engine speed, engine crank angle, temperature, engine load, and fuel delivery.